Socioeconomic factors in disability retirement due to mental disorders in Finland

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Background: Previous research has identified low socioeconomic status (SES) as an epidemiological risk factor for early retirement and disability pension (DP) due to mental disorders. This study aims to examine these associations in greater detail, with separate consideration of the risk factors for mood disorders (F30–39) and non-affective psychotic disorder (F20–29) DP. **Methods:** In this case–control setting the subjects ($N = 36\,879$) were all those granted DP due to a mental disorder for the first time between 2010 and 2015 in Finland. All the subjects were matched with three controls for their gender, age and hospital district ($N = 94\,388$). Three measures of dimensions of SES were used: education, income and occupational status, as well as family type as a control factor. Differences between DP recipients and controls, and between diagnostic groups, were studied using calculated characteristics and conditional logistic regression models. **Results:** DP recipients often lived alone and had low educational and income levels. These characteristics were more prominent in non-affective psychotic disorder than in mood disorder DP. In white-collar occupational groups, the risk of DP was greater compared with blue-collar workers. Students were associated with the highest level of risk for all mental and mood disorder DPs. **Conclusions:** We found evidence of SES factors associating with mental disorder-related severe loss of working and studying ability in a disorder-specific way. Notably, white-collar workers had an increased risk of mental disorder DP. This could be related to the psychosocially demanding contemporary working life in non-manual work.

Introduction

Mental disorders are the leading cause of disability retirement in Finland. In 2018, over half (52%, 103 000 people) of all disability pensions (DPs) and over one-third (37%, over 8000 people) of all new DPs in Finland were granted primarily on the basis of a mental disorder diagnosis.[1] In the Finnish DP scheme, the applicant is required to have impaired working ability and sickness benefits for 300 days before applying for DP. The application for temporary or permanent DP is then evaluated nationally by medical insurance specialists.

Previous research has identified low socioeconomic status (SES) and social/income inequality as important epidemiological risk factors for mental disorders.[2–11] Definitions of SES vary and several factors contribute to it, the most common in the literature being education, occupation and income.[12] In addition to SES, a person's living arrangement or type of family can be an important factor affecting mental health. In Finland, people living alone and/or unmarried have been shown to have more psychiatric symptoms and disorders than those who are cohabiting.[8,13,14]

Low SES consequently also predicts a greater risk of mental disorder DP. Studies have found a link between low occupational status,[15–18] unemployment,[19,20] low education[15,21,22] or low income[23] and increased risk of DP. Interestingly, a study by Leinonen et al.[24] identified a non-linear link between occupational status and mental disorder DP, whereas in the same study the link was linear in the case of DP for all reasons and due to musculoskeletal diseases. In this study, semi-professionals and routine white-collar employees had a higher risk of mental disorder DP than managers, professionals and blue-collar workers. This may indicate that the association between occupational status and DP might not be as straightforward as in the case of other SES factors.

The effects of individual SES factors on health and DP can to some extent be explained and mediated through the other SES factors, especially because a person's education and occupational status are mediated through their income.[12,25] In Finland, there is evidence that income level and financial difficulties may have a stronger association with mental disorders than education or occupation.[9,26] Despite this, it has been argued that several of the SES factors should always be considered simultaneously when studying the effects of SES, because they are ultimately only partially independent or interdependent determinants of health and cannot be directly replaced with one another.[25,27,28] SES can thus be seen as a multidimensional construct reflecting a person's living and working conditions as well as material, psychological and social resources, which guide peoples' choices and behaviors contributing to their social, environmental and behavioral risks and stress.[2] In this study, we simultaneously utilize several SES factors both separately and together in order to study their connections and risk groups in detail.

Despite the current level of understanding, the research literature still lacks precise information on the role of SES factors in mental disorder DP and their differences between different diagnostic groups. The aim of this study was to examine the interconnected effects of SES factors with mental disorder DP, focusing additionally on the two largest diagnostic groups in mental disorder DP in Finland, ICD-10 classifications F30–39 (mood disorders) and F20–29 (non-affective psychotic disorders).[29] To the best of our knowledge, this study is first to examine the relationship between multiple SES factors and mental disorder DP extensively in a large, high coverage national data set in a case–control setting for the

purposes of risk calculation. This study is part of the RETIRE research project, which aims to study the risk factors and sequences of mental health based disability pensioning and to analyze the effectiveness of service systems in different hospital districts in Finland.[30]

Methods

Study population

The subjects of the study were all Finnish citizens granted either a temporary or permanent DP due to a mental disorder (ICD 10: F04–F69 and F80–F99) for the first time between 2010 and 2015 ($N = 50\,728$). The utilized data originated from the registers of The National Social Insurance Institution of Finland (SII), The Finnish Centre for Pensions, the National Institute for Health and Statistics Finland. The subjects were matched with three controls based on their gender, age and hospital district from the population registers of Statistics Finland.

The combined database was stored and analyzed on the server of Statistics Finland. The following subjects and controls were omitted from the final dataset: (i) people with previous pensions (residual $N = 160\,564$); (ii) people aged under 18 or over 65 ($N = 159\,049$); (iii) people who had moved to a new hospital district during the last three years before DP ($N = 131\,722$) and (iv) people living in the Åland Islands because of the district's small sample size and divergent sample. The final data set included 36 879 subjects with mental disorder DP and their matched controls (altogether $N = 131\,267$).

Factors and SES

Based on prior literature, we selected three factors from the data to represent the several dimensions of SES: education, income and occupational status. In addition, we also studied family type because previous studies have indicated its importance for explaining mental health. The values used for subjects and controls were from 1 year before entering DP.

Family type was categorized into four groups: living alone, couple (living together with a partner without children), couple with children (living with a partner and one or more children) and single parent.

Education was categorized into five groups in line with the classification of Statistics Finland. Basic level means at most nine years of education, which is the length of mandatory basic education in Finland. Upper secondary level education means spending 11–12 years in basic education, including high school or vocational school. Short-cycle tertiary education lasts 2–3 years after upper secondary education and includes qualifications which are not polytechnic degrees. Lower degree level tertiary education means 3–4 years of education after upper secondary education and comprises polytechnic degrees and lower university degrees. Higher degree level tertiary education comprises education with a duration of at least 5–6 years after upper secondary education and leading to master's degrees, scientific licentiates and doctorate degrees.

Income was calculated for each subject and control by dividing the income of the person's household (measured by Statistics Finland) with OECD's consumption unit, in which the size of the consumption unit represented by the household dwelling unit is indicated as the sum of the weights of its members. The resulting average income in euros per person per year was divided into five quantiles based on the data: lowest (<14 454e), middle-lower (14 455e–20 468e), middle (20 469e–25 931e), middle-higher (25 932e–33 254e) and highest (more than 33 255e).

Occupational status of subjects and controls was classified into seven groups in accordance with the classification of Statistics Finland: blue-collar worker, lower white-collar worker, upper white-collar worker, entrepreneur, agriculture and forestry entrepreneur, student and unemployed.

Statistical analysis

The differences between the category variables were calculated with χ^2 test, while the differences between the continuous variables were determined with the independent samples *t*-test. A supplementary analysis was calculated for the student category. We used conditional logistic regression to detect the associations between the different exposures, i.e. socioeconomic factors and family type and the outcome DP. We first created crude models, i.e. univariate models for each exposure separately, with which we computed the odds ratios (ORs) and 95% confidence intervals (95% CIs). Further, for controlling confounding factors, we adjusted the model with education, income, occupational status and family type and used a multivariable conditional logistic regression model where these exposures were entered simultaneously. The models were evaluated with Nagelkerke's pseudo-R^2. The collinearity of the exposures was assessed with generalized variance inflation factor (GVIF) adjusted for each exposure based on the degrees of freedom. Since all exposures resulted in a GVIF below 2, there was no indication of issues with collinearity. Furthermore, the interaction between exposures was assessed, but since there were no improvements to the model, the interactions were not included in the final model. There were some SES information missing within the data (table 2). These missing values have been omitted from the regression analysis. Statistical analyses were conducted with SPSS Statistics Version 25 and R package ggplots2.[31]

Results

Descriptive analysis

The distribution of the principal F-diagnostic groups on which basis DP was granted for men, women and both genders is presented in table 1. The mean age for all mental disorder DP recipients was 44 years (SD 13.3). Mood disorders F30–39 accounted for approximately two-thirds of all mental disorder-related DPs, at 65.4% (mean age 47 years, SD 12.1). The second largest DP group were non-affective psychotic disorders F20–29, with 16.7% of DPs (mean age 36 years, SD 12.4). In women and older people, mood disorders were a greater part of their overall retirement, whereas non-affective psychotic disorders were more prominent in the case of DP of men and younger people ($P < 0.001$, age mean difference 10.71, 95% CI 10.37–11.05).

The frequencies and percentages of the sociodemographic and SES characteristics are presented in table 2 for subjects with DP (separately for mood disorders and non-affective psychotic disorders) and their controls: gender, age, family type, education, income and occupation (Supplementary table S1 for other diagnostic groups). Because the controls were matched for gender and age, these factors were omitted from the table. About 55.6% of all DP recipients were women. When compared with controls, the DP recipients were often living alone and had lower educational and income levels ($P < 0.001$), the differences being even clearer in non-affective psychotic disorder than in mood disorder DP ($P < 0.001$). In occupational status, the greatest difference between subjects and controls was in students, in which group the pensioned students were a notably larger portion of all pension receivers than in controls (DP recipients 14.4% vs. controls 6.4%; $P < 0.001$). This difference was also notably higher in non-affective psychotic disorder than in mood disorder DP, in which over one-fourth of all DP recipients were classified as students (F20–29: 27.3% vs. F30–39: 10.9%; $P < 0.001$).

Further, we computed the characteristics of student age and achieved level of education for all mental disorder DPs ($N = 4048$, 14.4% of all occupational groups), mood disorder DPs ($N = 2128$, 10.9%), non-affective psychotic disorder DPs ($N = 1110$, 27.3%) and controls ($N = 5828$, 6.4%) (Supplementary table S2). The mean age of students was higher for mental disorder DP recipients (28 years, SD 9.9) than for controls (26 years, SD 9.5), $P < 0.001$. The students with mood disorder DPs were older (mean 31 years, SD

Table 1 Principal diagnoses of subjects granted disability pension for mental disorders in 2010–15

	All (%), N = 36 879	Men (%), N = 16 380	Women (%), N = 20 499	Stat. significance
Principal diagnosis				
F04–09	475 (1.3)	295 (1.8)	180 (0.9)	$P < 0.001$
F10–19	1318 (3.6)	1014 (6.2)	304 (1.5)	$P < 0.001$
F20–29	6171 (16.7)	3603 (22.0)	2568 (12.5)	$P < 0.001$
F30–39	24 132 (65.4)	9195 (56.1)	14 937 (72.9)	$P < 0.001$
F40–48	2735 (7.4)	1091 (6.7)	1644 (8.0)	$P < 0.001$
F50–59	247 (0.7)	37 (0.2)	210 (1.0)	$P < 0.001$
F60–69	535 (1.5)	276 (1.7)	259 (1.3)	$P < 0.001$
F80–89	1069 (2.9)	734 (4.5)	335 (1.6)	$P < 0.001$
F90–99	197 (0.5)	135 (0.8)	62 (0.3)	$P < 0.001$

F04–09: organic, including symptomatic, mental disorders. F10–19: mental and behavioral disorders due to psychoactive substance use. F20–29: schizophrenia, schizotypal and delusional disorders. F30–39: mood (affective) disorders. F40–48: neurotic, stress-related, and soma-toform disorders. F50–59: behavioral syndromes associated with physiological disturbances and physical factors. F60–69: disorders of adult personality and behavior. F80–89: disorders of psychological development. F90–99: behavioral and emotional disorders with onset usually occurring in childhood and adolescence. F90–98: unspecified mental disorder F99.

Table 2 Sociodemographic and socioeconomic characteristics of subjects with disability pension granted for mental disorders in 2010–15

Group	All cases (%) N = 36 879	F30–39 (%) N = 24 132	F20–29 (%) N = 6171	Controls (%) N = 94 388
Gender				
Men	16 380 (44.4)	9195 (38.1)	3603 (58.4)	–
Women	20 499 (55.6)	14 937 (61.9)	2568 (41.6)	–
Age				
18–25	5141 (13.9)	2005 (8.3)	1639 (26.6)	–
26–35	5919 (16.0)	3152 (13.1)	1755 (28.4)	–
36–45	6417 (17.4)	4252 (17.6)	1213 (19.7)	–
46–55	10 131 (27.5)	7616 (31.6)	1039 (16.8)	–
56–65	9271 (25.1)	7107 (29.5)	525 (8.5)	–
Family type				
Living alone	16 311 (44.2)	9068 (37.6)	3817 (61.9)	20 628 (21.9)
Couple	9302 (25.2)	7303 (30.3)	733 (11.9)	29 645 (31.4)
Couple with children	7642 (20.7)	5261 (21.8)	1110 (18.0)	37 104 (39.3)
Single parent	3624 (9.8)	2500 (10.4)	511 (8.3)	7011 (7.4)
Education				
Basic level	10 821 (29.3)	5847 (24.2)	2170 (35.2)	16 090 (17.0)
Upper secondary level	17 338 (47.0)	11 527 (47.8)	3016 (48.9)	44 451 (47.1)
Short-cycle tertiary	4192 (11.4)	3377 (14.0)	350 (5.7)	13 229 (14.0)
Lower degree tertiary	2339 (6.3)	1742 (7.2)	353 (5.7)	10 277 (10.9)
Higher degree tertiary	2189 (5.9)	1639 (6.8)	282 (4.6)	10 341 (11.0)
Income[a]				
Lowest	11 906 (33.3)	6308 (26.6)	2757 (48.5)	11 890 (12.7)
Middle-lower	8276 (23.2)	5554 (23.4)	1310 (23.0)	16 143 (17.3)
Middle	6191 (17.3)	4554 (19.2)	794 (14.0)	19 780 (21.2)
Middle-higher	4993 (14.0)	3814 (16.1)	519 (9.1)	21 954 (23.5)
Highest	4341 (12.2)	3526 (14.8)	309 (5.4)	23 627 (25.3)
Occupation[b]				
Blue-collar worker	5849 (20.8)	4088 (21.0)	925 (22.8)	22 248 (24.3)
Lower white-collar worker	8293 (29.5)	6639 (34.1)	668 (16.4)	29 718 (32.5)
Upper white-collar worker	3371 (12.0)	2672 (13.7)	330 (8.1)	15 986 (17.5)
Entrepreneur	1621 (5.8)	1283 (6.6)	144 (3.5)	6610 (7.2)
Agriculture entrepreneur	376 (1.3)	274 (1.4)	63 (1.6)	1 784 (1.9)
Student	4048 (14.4)	2128 (10.9)	1110 (27.3)	5828 (6.4)
Unemployed	4555 (16.2)	2368 (12.2)	824 (20.3)	9320 (10.2)

Separately for all mental disorder cases, mood disorders (F30–39), non-affective psychotic disorders (F20–29) and study controls. Statistical significance was tested with the chi-squared test for the categories family type, education, income, and occupation between all cases and controls; F30–39 and controls; F20–29 and controls and between F30–39 and F20–29. The tests for each category with these comparisons resulted in $P < 0.001$.
a: Some cases had missing information: all cases N = 35 ,707; F30–39 N = 23 756; F20–29 N = 5689 and controls N = 93 394.
b: Some cases had missing information: all cases N = 28 113; F30–39 N = 19 452; F20–29 N = 4064 and controls N = 91 494.

10.8) than non-affective psychotic disorder DPs (mean 27 years, SD 8.0) ($P < 0.001$). For mood disorder DPs over half of the student pensioners had completed upper secondary level education (51.6%) and for non-affective psychotic disorder DPs most had only basic level education (49.6%).

Risk factors for premature psychiatric retirement

The ORs and 95% CIs were calculated for all mental disorder-related DPs and for mood/non-affective psychotic disorder DPs using conditional logistic regression analysis and are shown in table 3. Based

Table 3 Socioeconomic differences for all mental disorder-related disability pensions (DP), mood disorder (F30–39) disability pensions and non-affective psychotic disorder (F20–29) disability pensions in Finland by odds ratio (OR) and 95% confidence interval (95% CI)

	All mental disorder DP				F30–39 DP				F20–29 DP			
	Crude model		Final model[a]		Crude model		Final model[b]		Crude model		Final model[c]	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Family type												
Couple with children (reference)	1.00		1.00		1.00		1.00		1.00		1.00	
Living alone	3.97	3.84–4.11	2.15	2.06–2.24	3.32	3.18–3.47	2.09	1.99–2.20	6.15	5.64–6.70	2.65	2.37–2.95
Couple	1.55	1.49–1.61	1.53	1.46–1.59	1.66	1.59–1.74	1.72	1.63–1.81	1.13	1.01–1.26	1.00	0.88–1.14
Single parent	2.50	2.38–2.63	1.58	1.49–1.67	2.50	2.36–2.65	1.61	1.50–1.73	2.43	2.14–2.77	1.56	1.33–1.82
Education												
Higher degree tertiary (reference)	1.00		1.00		1.00		1.00		1.00		1.00	
Basic level	3.46	3.28–3.66	1.98	1.84–2.14	2.69	2.52–2.87	1.71	1.57–1.87	5.10	4.40–5.91	2.37	1.90–2.97
Upper secondary level	1.89	1.80–1.99	1.32	1.24–1.42	1.83	1.72–1.94	1.36	1.26–1.48	2.21	1.93–2.54	1.23	1.00–1.51
Short-cycle tertiary	1.51	1.42–1.60	1.29	1.20–1.39	1.52	1.42–1.63	1.32	1.21–1.43	1.47	1.23–1.76	1.15	0.90–1.47
Lower degree tertiary	1.07	1.01–1.15	0.99	0.92–1.07	1.12	1.04–1.21	1.03	0.95–1.13	1.09	0.92–1.30	0.96	0.76–1.21
Income												
Highest (reference)	1.00		1.00		1.00		1.00		1.00		1.00	
Lowest	6.54	6.25–6.85	2.30	2.17–2.45	4.84	4.59–5.11	2.12	1.97–2.28	14.29	12.40–16.47	3.21	2.69–3.83
Middle-lower	3.22	3.07–3.36	2.20	2.08–2.32	2.89	2.74–3.04	2.24	2.10–2.38	5.06	4.39–5.84	2.54	2.15–3.00
Middle	1.88	1.80–1.97	1.65	1.57–1.74	1.79	1.70–1.88	1.67	1.57–1.77	2.76	2.38–3.20	2.10	1.78–2.48
Middle-higher	1.32	1.26–1.38	1.25	1.19–1.31	1.26	1.20–1.33	1.25	1.18–1.32	1.76	1.51–2.06	1.54	1.30–1.82
Occupation												
Blue-collar worker (reference)	1.00		1.00		1.00		1.00		1.00		1.00	
Lower white-collar worker	0.98	0.94–1.02	1.21	1.15–1.26	1.06	1.01–1.11	1.28	1.21–1.35	0.62	0.55–0.70	0.74	0.65–0.85
Upper white-collar worker	0.73	0.70–0.77	1.31	1.23–1.39	0.77	0.72–0.81	1.34	1.24–1.44	0.58	0.50–0.67	1.06	0.88–1.27
Entrepreneur	0.86	0.81–0.92	0.99	0.92–1.06	0.90	0.83–0.97	1.03	0.95–1.12	0.72	0.59–0.89	0.85	0.68–1.06
Agriculture and forestry entrepreneur	0.71	0.63–0.80	0.79	0.70–0.90	0.66	0.58–0.76	0.76	0.66–0.88	1.31	0.95–1.81	1.49	1.05–2.11
Student	3.40	3.20–3.62	2.93	2.74–3.14	3.87	3.56–4.21	3.50	3.20–3.83	3.35	2.94–3.83	2.50	2.16–2.91
Unemployed	1.78	1.70–1.87	1.34	1.27–1.42	1.29	1.21–1.37	1.05	0.98–1.12	2.33	2.06–2.64	1.50	1.30–1.73

Crude model: CLR model for data with controls matched based on gender, age and hospital district. Final model: multivariable CLR model adjusted on the basis of all factors in the table. Nagelkerke pseudo-R: [a]0.235; [b]0.194; [c]0.425.

on the matched case–control design, the crude model was adjusted for age, gender and hospital district. Further, the final model was additionally adjusted for family type, education, income and occupational status.

The highest risk for early pension was associated with the student category in overall mental disorder DP (OR 2.93; 95% CI 2.74–3.14) and in mood disorder DP (OR 3.50; 95% CI 3.20–3.83), and with the lowest income group in non-affective psychotic disorder DP (OR 3.21; 95% CI 2.69–3.83). The overall effects of education and income levels on early retirement appear to follow a negative trend: higher levels of education or income associate with a lower risk of mental disorder DP. Further, within family type, living alone is associated with the highest risk for DP and couples with children with the lowest risk for DP in all models except for non-affective psychotic disorders, in which they are on the same level as couples without children.

Although the ORs in other SES exposures remained consistent in their direction after adjusting for all factors in the final models, in occupational status the risk of mental disorder DP increased in white-collar occupational groups above the reference point of blue-collar workers' risk in all mental disorder and mood disorder DPs. The OR for entrepreneurs increased to the same level as that of blue-collar workers. The OR for agriculture and forestry entrepreneurs remained mostly the same, being even lower than for blue-collar workers, before and after controlling for other factors. The OR for the unemployed also remained mostly the same, rather higher than for blue-collar workers, except in DP for mood disorders, in which it decreased to the same level as in blue-collar workers after controlling for all factors in the model. Figure 1 illustrates the OR and 95% CI of the final statistical models for all mental disorder and mood/non-affective psychotic disorder DPs.

Discussion

In our comprehensive case–control data on mental disorder DP in Finland, we found socioeconomic differences to be major epidemiological risk factors for premature psychiatric retirement. Overall, mental disorder DP appears to be associated with lower SES, including shorter formal education and lower income, in addition to a more frequent status of living alone. As a novel finding, we found that white-collar occupational status involves an increased risk of mental disorder DP, particularly indicated for mood disorders, after adjusting for education, income and family type. We also found that among SES the student category had the highest risk associated with mental disorder DP.

In Europe, low SES is associated with higher rates of absence from work but few studies have been conducted outside the Nordic countries concerning the association of SES and DP.[11] The negative trend of educational and income effects on DP is in line with the results of previous research[15,21–23] and is well documented in the literature. The association of manual work with a greater level of risk has also been reported in previous research.[15–18] However, our study extends the existing knowledge about the association of SES and DP by showing that after controlling for SES and family type, the level of risk in lower and upper white-collar occupations rose above that of blue-collar workers.

Particularly in non-manual professions, working life has probably become more autonomous for individual workers, but at the same time this autonomy has resulted in more interdependences and structural demands between workers than before possibly making non-manual work more psychosocially demanding.[32] One previous study that identified a non-linear (U-shaped) association between occupational status and mental disorder DP also recognized job
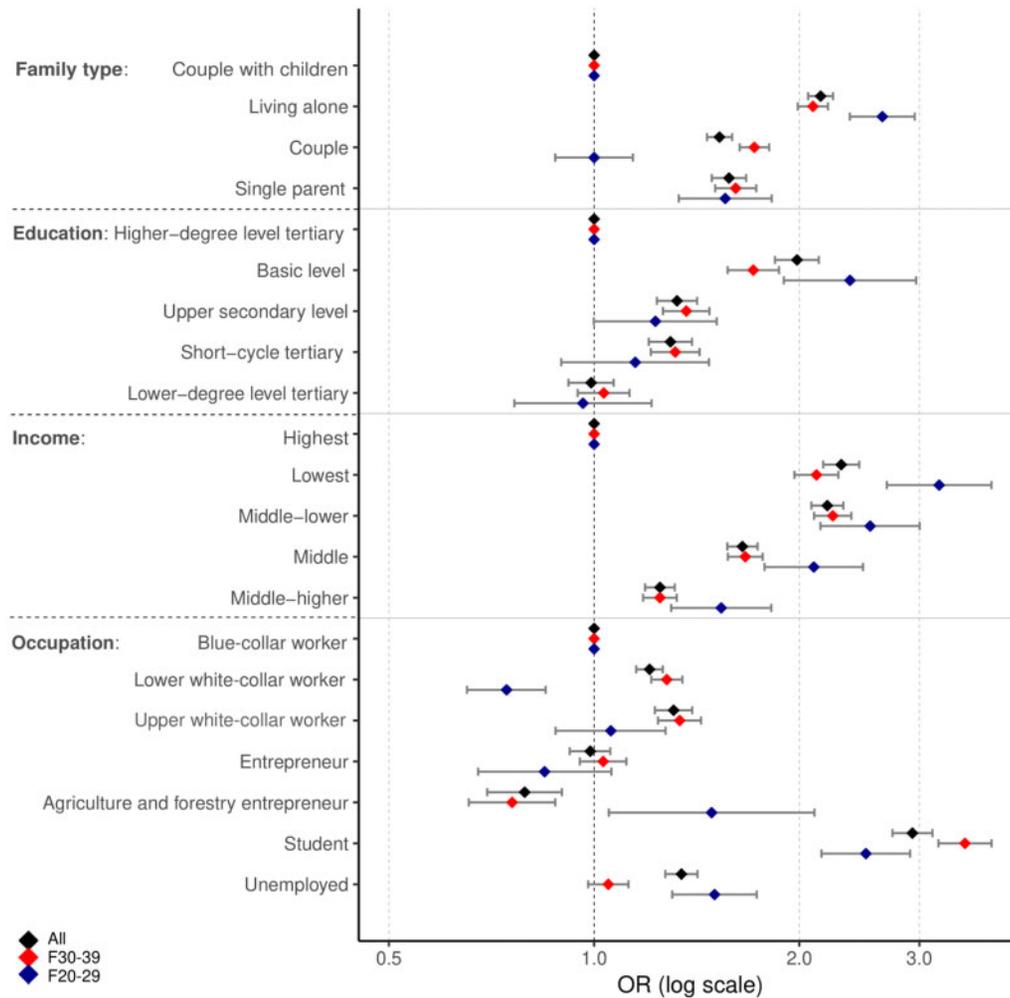
Figure 1 Socioeconomic differences for all mental disorder-related disability pensions (black), mood disorders F30–39 disability pensions (red) and non-affective psychotic disorders F20–29 disability pensions (blue) in Finland by OR and 95% CI as a dot plot figure of final statistical models (adjusted for age, gender, hospital district and all factors in the figure). Reference groups for each factor are marked as 1.0

control as a mediator between this association, as well as identifying strenuous desktop work and high job demands as factors exacerbating the SES differences.[24] Our results indicate that white-collar occupations are associated with an increased risk of premature retirement because of mental disorders, or more accurately because of mood disorders, after accounting for education, income and family. In non-manual work, mood disorders could affect one's mental working ability in a psychosocially more demanding, strenuous and uncontrollable environment and thus more compellingly lead to a DP. In contrast, blue-collar workers could possibly have depressive symptoms or diagnosed depression without having their physical working ability critically compromised, thus not necessarily resulting in DP.

Furthermore, although this study indicates that higher educational levels are associated with a lower risk of mental disorder DP, it is important to note that being a student was associated with the highest levels of risk in all mental and mood disorder DPs. Our supplementary analysis indicated that at the point of early retirement the students were still mainly young but three years older than the control group's students and even 5 years older in the case of mood disorder DP recipients. In the case of mood disorders, half of the retired students had already completed their secondary upper level education and thus were most probably students in universities or universities of applied sciences. In non-affective psychotic disorder DP, most of the students were probably in high school or vocational school, having completed only basic level education.

It is possible that in this sub-population in our data, we see a clustering of several simultaneous risk factors,[16,33] the result of which are mental health problems so severe that they result in premature pensioning for these students. Because retired students are older than controls, it is possible that student DP recipients have struggled with mental disorders for many years before they apply for a DP, which has greatly delayed their studies. This has also prevented them from graduating and moving on to higher educational, occupational and income levels. It is also possible that the retired students include more people who have not started their studies until adult age or people participating in vocational rehabilitation.

Concerning the two major diagnostic groups, women and older people had a higher rate of DP due to mood disorders, whereas men and younger people were more prominent in DP for non-affective psychotic disorders, partly in convergence with the epidemiology of these disorders. The incidence of depression has been found to be approximately 2-fold higher in women than in men.[34,35] However, in our data the difference between genders in mood disorder DP was lower. This could indicate a higher threshold for seeking help or more difficulties for men themselves or for our diagnosis system to identify depression in men and/or greater severity of mood disorders among men receiving DP for mental disorders.[36,37]

Couples without children had a higher risk of DP for mood disorders than for non-affective psychotic disorders. Regarding

occupational status, upper and lower white-collar workers had a higher risk of DP due to mood disorders than non-affective psychotic DP and agriculture and forestry entrepreneurs and the unemployed had a higher risk of DP due to non-affective psychotic disorders. In addition to the effects of the primary disorders, this may support the above interpretation concerning the heightened level of risk for white-collar workers in their demanding working life. Furthermore, the high level of education usually required by white-collar professions can reduce the number of people at risk for non-affective psychotic DP in this population, as the onset of psychotic disorders usually earlier in life hinders the progression of studies and employment in white-collar working positions.

Societal implications

Mental health problems and resulting DPs are one of the highest societal expenses in many high-income countries. In our study we originally identified over 50 000 people with a first-time mental disorder DP in only a 6-year timeframe. Available preventive efforts are welcomed in the social determinants of mental health, which play a major role in the societal incidence of mental disorders and thus mental disorder DPs, as was also seen in this study.[2,5,10]

Non-manual work has become more autonomous and psychosocially demanding than previously, which can be a cause of great stress and pressure for many. This should be acknowledged in any national efforts striving to promote a healthy and sustainable working life in the long term in order to decrease the risk of mental and mood disorder DP in the trends and processes of occupational life. White-collar workers with decreased working ability could perhaps better retain and strengthen their capability to work in an adapted workplace and working community, as well as through vocational activity. Early recognition and preventive consideration should be targeted to students because of their high risk of mental disorder DP. Although outside the scope of this study, it is probable that temporary pensions are more common in younger people and students, and therefore their return to work should be supported by appropriate actions.

Strengths and limitations

The strengths of this study include the use of comprehensive, high coverage national-level data registers together with a large-scale case–control setting. In an international context, Finnish registers are of high quality allowing the detailed and extensive research of different socioeconomic factors and their interrelationships in this study.[38,39] To our knowledge, there has not previously been any such extensive study of mental disorder DP.

Due to the study design one limitation is that we could not calculate ORs for age or gender. Furthermore, temporal assumptions considering the changes in factors affecting DP rates or the exact effects of changing working life cannot be made. These changes could be an important subject of further research.

Conclusions

We found evidence in a comprehensive case–control setting that several SES factors known to contribute to mental disorders also contributed to the loss of working and studying ability in a disorder-specific way and resulted in premature psychiatric pensioning. In particular, white-collar workers may currently be at a heightened risk of mental and mood disorder DP. Focusing on the mental health and well-being of students also appears to be indicated.

Supplementary data

Supplementary data are available at EURPUB online.

Key points

- DP recipients due to mental disorders often had low educational and income levels and lived alone.
- In terms of occupational status white-collar workers had an increased risk for DP, particularly due to mood disorders, after controlling for education, income and family.
- Students had the single highest risk for all mental and mood disorder DPs.
- Women and older people had a higher rate of DP due to mood disorders, whereas men and younger people were more prominent in DP for non-affective psychotic disorders.

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